

HEAVY VEHICLE PROPULSION SYSTEM MATERIALS PANEL

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ABSTRACT

Detroit Diesel Corporation (DDC) is participating in the Advanced Ceramic Manufacturing Technology (ACMT) Program in the design and testing of a ceramic exhaust valve. Our efforts have progressed from proof testing of supplied valves and overspeed fixture tests to engine tests on a durability cycle. A five-hundred hour durability test was completed, and a second five-hundred hour test is ongoing. Dynamic modeling of the engine valve train provided insight into improvements in overspeed capability, valve seating velocity, and engine breathing that can be realized with the ceramic valve.

Although the technical feasibility of running ceramic valve in a heavy duty diesel engine has been proven, cost is still a significant factor in considering ceramic valve for production engines.

DDC has an established core competency in application of advanced materials to diesel engines. We envision the potential for the

following advanced materials applications for future engines:

- MATERIALS FOR NO_x CATALYSTS
- SMART MATERIALS - actuators, sensors
- METAL MATRIX COMPOSITES - light weight materials
- PLASTIC MATRIX COMPOSITES - intake manifold, other components
- CERAMICS - for sleeve bearings, bushings, piston rings
- ENVIRONMENTALLY FRIENDLY FLUIDS - oils, lubricants, fuels
- SOUND ABSORPTION MATERIALS